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J. R. R. Tolkien's Legendarium as Heterodox Palaeoscience

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Abstract

J. R. R. Tolkien's *The Lord of the Rings* and its associated works are known for being tremendously influential in the fantasy fiction genre, as well as inspiring popular films and other spinoffs. The debt of *The Lord of the Rings* to mediaeval European literature is also widely recognised. While the role of fiction as both influence on and by Tolkien's work is widely acknowledged, the influence of a range of palaeoscience topics on Tolkien – some of which were outside the mainstream of his time before becoming accepted – are less well known. This article synthesises research into the conception of Tolkien's usage of heterodox palaeoscience in his works to explore the reception of those themes in his fiction. Not only was Tolkien himself – at times against his own inclinations – retroactively curious about the evolving scientific validity of his works, but so were his growing fanbase, especially those active in the modern realm of fringe science promoters.

Keywords

Tolkien, literature, palaeoscience, geomythology, gondwanaland, cryptozoology, alt-right, creationism

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Introduction

On 21 September 1937, a South African-born Oxford professor of languages named John Ronald Reuel Tolkien (1892–1973) published *The Hobbit*, a work based on bedtime stories he told to his children. From this humble origin, *The Hobbit* became one of the best-selling novels of all time, being incorporated into a 'legendarium' including the three-volume follow-up novel *The Lord of the Rings* (1954–1955); *The Silmarillion* (1977), a posthumous collection of myths and histories of the setting, Middle-earth; the massively successful 2001–2003 film adaptations of *The Lord of the Rings* directed

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by Peter Jackson, and his less popular trilogy based on *The Hobbit* (2012–2014); and *The Rings of Power* (2022-present), an Amazon series considered the most expensive television production in history.

Science as both inspiration for and depiction in Tolkien's work has been occasionally explored, particularly with astronomy, botany (Hazell 2006; Judd and Judd 2017), and physics. Although the latter field is not widely associated with Tolkien, the author was greatly interested in the heterodox physics expressed by British philosopher J. W. Dunne in his book *An Experiment with Time* (1927), which proposed that consciousness and the physical brain experienced the passage of time at different rates (Dunne 1927, 126–154). This model of time was very influential in Tolkien's abandoned time travel novels, *The Lost Road* and *The Notion Club Papers* (Flieger 1997, 81–86). That Dunne's ideas were never accepted by the scientific mainstream did not prevent their usage by Tolkien, demonstrating that in at least one field, he certainly had no compunction against integrating heterodox science.

As with physics, the usage of geology and palaeontology in Tolkien's works has been much less explored than astronomy and botany (Larsen 2015, 167). Due to the large span of time (1917–1972) in which Tolkien developed his stories, mainstream scientific consensus on many fields touched upon by him changed: In some cases predicting the adoption of fringe theories by the mainstream, and in other cases endorsing once-mainstream theories as they entered the fringe. These include such diverse fields as human evolution (or its rejection), survival of relict prehistoric species, geological bases for historical legends including Atlantis, and continental drift. Tolkien was a subtle reader of a wide range of palaeoscience, wanting his legendarium to carry the imprimatur of general scientific credibility, even if he did not seem too concerned with either the details or state of controversy over some of the scientific views he drew from. The specific flux of the state of palaeoscience was perhaps appealing to someone who studied mythologies with their contradictions and uncertain origins, placing Tolkien in continuity with academics as varied as Joseph Campbell and Carl Sagan (O'Connor 2013, 19–33).

The first part of this article will explore some of the ways in which Tolkien's work has been interpreted – by himself in retrospect, as well as by subsequent scholars – in connection with evolving palaeoscience. This includes not only determining how palaeoscientific notions influenced Tolkien's work, but also how Tolkien's legendarium was retroactively interpreted via changing mainstream notions of the deep past. Although undertaken by educated scholars, the latter activity necessarily involves a degree of fiction (some might call fanfiction) in creatively expanding, and in some cases bending, what Tolkien wrote, in order to fit what might be termed the changing canon of science.

The historiography of the initial section of this article covers works that bridge what might be termed 'pure' literary analysis and 'pure' science. This methodology sets the stage for the ending section, which covers a more amateur interpretation of the palaeoscience elements of Tolkien's work by a more heterodox section of the public. Given the extreme popularity of Tolkien's works and their adaptations in the second half of the twentieth century – a period of intense social, political, and scientific change – Tolkien's world was not only shaped by heterodox palaeoscience, it also, however inadvertently, promoted heterodox palaeoscience to the wider public. This allowed his fiction to project scientific views that were mainstream when written in the mid-twentieth century to audiences decades later – readers who were already taken in by the uniquely detailed worldbuilding Tolkien applied to his fantasy setting and were therefore primed to absorb some of his now-heterodox scientific notions. For readers who yearned to escape from the mundanities of reality to the intricately described magic of Middle-earth – especially for a certain subset of fans already yearning for an imagined past devoid of racial minorities or democratic political structures – Tolkien's work has not only enabled the continued acceptance of a number of now-heterodox palaeoscientific beliefs, but provided a sort of ideological justification bridging the gap between heterodox palaeoscience and heterodox politics.

A Long Time Ago …:

Middle-earth – despite a misconception of its name indicating a physical location in-between 'our' world and another plane of existence – is meant to be our own planet, specifically in an 'imagined pre-history' in which, due to the passage of time and geological change, only a few cultural elements and broad geographical similarities survived to our current era (Rateliff 2006, 67–100; Tolkien 2004, 1–3). Within the internal chronology of the legendarium, *The Hobbit* and *The Lord of the Rings* are set at the end of the Third Age of history, an era following a Second Age characterised by the dominance of the island kingdom of Númenor. Númenor originated in an unrelated and unfinished time travel novel, *The Lost Road*, that Tolkien begun around 1936, inspired by Dunne's ideas on time. The main character would travel back in time to the fall of Atlantis, called Númenor by its natives (Tolkien 1981, 233). Tolkien wrote in 1955 that he had 'what some might call an Atlantis complex,' including recurring dreams of being on the island when it was destroyed by what he termed the 'Great Wave' (Carpenter 1977, 23, 170; Flieger 1997, 121–23; Larsen 2020, 3; Tolkien 1981, 204, 226). This language might reflect the influence of the Atlanticist Lewis Spence, who traced the vestiges of what he termed an 'Atlantis culture-complex' across the world (Spence 1925, 6). In his notes, Tolkien continued to associate Númenor with Atlantis even after incorporating the former into his legendarium, and would refer to it as 'Númenor-Atlantis' in his personal correspondence (Fonstad 1991, 43–45; Tolkien 1981, 172).

Atlantis was invented by Athenian philosopher Plato in his c. 360 BCE dialogue *Timaeus*. Appropriately for its adaptation as Númenor, the Atlantis legend as understood today largely emerged into public consciousness with its inclusion in science fiction author Jules Verne's 1870 novel *Twenty Thousand Leagues Under the Seas*, and then fleshed out via a pseudo-scientific retelling in populist politician Ignatius Donnelly's 1882 *Atlantis: The Antediluvian World*. Donnelly's work helped promote the notion of hyperdiffusionism, that many of the world's cultures have similar features that can be explained from an ancient common origin – in this case, Atlantis (Feder 2010, 28–35; Flieger 1997, 168–69; Larsen 2020, 6–7). That hyperdiffusionism was something Tolkien considered in his academic work is evident from his 1939 essay 'On Fairy-Stories,' where he discusses the origin of fairy tales from across the world – the study of which played into the development of his legendarium:

> It is plain enough that fairy-stories (in wider or in narrower sense) are very ancient indeed. Related things appear in very early records; and they are found universally, wherever there is language. We are therefore obviously confronted with a variant of the problem that the archaeologist encounters, or the comparative philologist: with the debate between *independent evolution* (or rather *invention*) of the similar; *inheritance* from a common ancestry; and *diffusion* at various times from one or more centres…. All three things: independent invention, inheritance, and diffusion, have evidently played their part in producing the intricate web of Story (Tolkien 1983, 121).

To his credit, Tolkien does state that invention is the most important element in the development of fairy tales from across the world. It should also be noted that in the 1910s and 1920s, hyperdiffusionism was more mainstream due to its promotion by major academics like anatomist Grafton Elliot Smith and had only started to fully enter into heterodoxy in the 1930s. In that light, Tolkien's approach here is subtler than contemporaneous prominent hyperdiffusionists, with his caveat of 'one or more centres' for the basis of diffusion helping him – perhaps inadvertently – escape being too committed to an idea that came to be fully discredited outside of modern orthodoxy.

Tolkien also explored diffusionism, and related then-heterodox concepts, in a 1971 letter to biographer Roger Lancelyn Green. On the concept of the Elves' departure from Middle-earth for the undying lands, Tolkien stated that the history described within the legendarium

> is not put forward as geologically or astronomically 'true'; except that some special physical catastrophe is supposed [within the fictional context] to lie behind the legends and marked the first stage in the succession of Men to dominion of the world. But the legends are mainly of 'Mannish' origin blended with those of the Sindar (Gray-elves) and others who had never left Middle-earth (Tolkien 1981, 447).

In addition to the hints of diffusionism and catastrophism – the notion that legends are remnants of historical disasters, influenced by nineteenth-century attempts to reconcile emergent geology with the Genesis narrative – the small number of Elves who did not vanish at the end of the Third Age strongly echoes the Turanian hypothesis. This was a Victorian notion that legends of elves, dwarves, and fairies originated in the first Indo-European settlers to Europe encountering earlier peoples, such as the Picts (Goodrum 2016, 392; Hynes 2012, 28; MacRitchie 1909, 160–76). Tolkien's student and folklorist J. S. Ryan argued that Tolkien's knowledge of the Turanian concept, via the philologist Max Müller's works, inspired the naming of Túrin Turambar, a hero of the First Age (Ryan 2013, 79–86). Tolkien himself seems to nod towards the Turanian hypothesis in his prologue to *The Fellowship of the Ring*, explaining how 'Those days, the Third Age of Middle-earth, are now long past, and the shape of all lands has been changed; but the regions in which Hobbits then lived were doubtless the same as those in which they still linger: the North-West of the Old World, east of the Sea' (Tolkien 2004, 2). It would be ironic if Scandinavian legends of dwarves and elves were inspired by human encounters with the last surviving Hobbits.

By Tolkien's 1971 letter to Green, hyperdiffusionism and Turanianism were themselves distinctly relicts, having passed from orthodox to heterodox during Tolkien's lifetime. This is part of a pattern of how Tolkien adopted science that, at the start of the twentieth century remained just on the edge of acceptability, only to become firmly rejected later. Another example is how the sciences of oceanography and geology seemed to offer a possible historical basis for Tolkien's favourite legend, Atlantis. In the legendarium, the Great Wave that sinks Númenor is accompanied by an eruption of the mountain of Meneltarma, located in the centre of the kingdom (Tolkien 1999, 335–36). There is no prior indication that Meneltarma is even a dormant volcano, and its peak was the location of religious ceremonies dedicated to the creator god, which were held in silence by the Númenóreans. If one is to presume to develop the lore of Middle-earth further, one might suppose that the association of Meneltarma with a creator god might make sense for a volcano (for example, Hekla in Iceland) and a sign that the Númenóreans knew of a previous eruption; the same with the tradition of silence, to listen for early warning sounds (Vitaliano 1968, 6–7; Þórarinsson 1970, 5–8).

Of interest also is that among the surviving Númenóreans on the mainland, there was a belief that the peak of Meneltarma remained visible as an island (Fonstad 1991, 51; Tolkien 1999, 337). This seems reminiscent of the theory that the Minoan eruption of 1600 BCE, whose remaining volcanic rim formed the modern island of Santorini, had been the origin of the Atlantis legend. This idea was first proposed in 1960 by Greek seismologist Angelos Galanopoulos (Feder 2010, 233–35; Galanopoulos 1960, 370–74; Larsen 2020, 8; Vitaliano 1968, 10–14). Although Tolkien continued to work on the history of Númenor in *The Silmarillion* until his 1972 death, it is possible that the similarities between Númenor-Atlantis and Santorini-Atlantis were coincidental rather than direct, with Tolkien anticipating what became one of the leading claims for an Atlantis grounded in history – perhaps influenced by the 1883 Krakatoa eruption, which geologist William Sarjeant argued produced terrain similar to Mordor (1996, 336).

Gondor Drift

The sinking of Númenor was only one example of the shifting of the geography of Middle-earth. Tolkien was interested in geology and how the science related to the science of Middle-earth, albeit expressing this interest after the fact in letters, wishing he had had more command of knowledge in the field to have included more of it in the actual writing. Interestingly, by interpreting the relation of Middle-earth to emerging geological science, Tolkien placed himself in the same position as his later fans who attempted to do so in the realm of Tolkien studies.

Perhaps the most detailed description of Middle-earth's relation to geology comes from Tolkien's 1958 letter to author Rhona Beare, where he stated that the legendarium

> Is merely an imaginative invention, to express, in the only way I can, some of my (dim) apprehensions of the world. All I can say is that, if it were 'history', it would be difficult to fit the lands and events (or 'cultures') into such evidence as we possess, archaeological or geological, concerning the nearer or remoter part of what is now called Europe; though the Shire, for instance, is expressly stated to have been in this region (Tolkien 1981, 298).

These views were expanded from those expressed in a 1955 letter to publisher Houghton Mifflin, where Tolkien stated that '"Middle-earth", by the way, is not a name of a never-never land without relation to the world we live in… though I have not attempted to relate the shape of the mountains and land-masses to what geologists may say or surmise about the nearer past, imaginatively this "history" is supposed to take place in a period of the actual Old World of this planet' (Tolkien 1981, 365).

In a 1954 letter to historian Hugh Brogan, Tolkien also explained that, 'As for the shape of the world of the Third Age, I am afraid that was devised "dramatically" rather than geologically, or palaeontologically. I do sometimes wish that I had made some sort of agreement between the imaginations or theories of the geologists and my map a little more possible. But that would only have made more trouble with human history' (Tolkien 1981, 238). In a 1956 letter to editor H. Cotton Minchin, Tolkien noted that when it comes to fans' interest in the geological history of Middle-earth, 'Having geological interests, and a very little knowledge, I have not wholly neglected this aspect, but its indication is rather more difficult – and perilous!' (Tolkien 1981, 264n1). Tolkien's description of the shifting geography of Middle-earth also parallels the shifting discussion in the wider scientific community over continental drift. The concept was proposed in 1912 by meteorologist Alfred Wegener, but remained heterodox until the 1960s (Hynes 2012, 22–24). Tolkien's use of shifting geography over Ages in Middle-earth is something of an endorsement of continental drift prior to its acceptance by mainstream science (Larsen 2015, 168).

Another aspect of geological knowledge was expressed by Tolkien in a 1971 letter to musician Graham Tayar, who had lived in Ethiopia in the 1960s. Tayar had asked whether Gondor – the kingdom established by the survivors of Númenor's sinking – had been named after the mediaeval Ethiopian royal capitol, Gondar. Tolkien replied that 'one's mind is, of course, stored with a "leaf-mould" of memories (submerged) of names, and these rise up to the surface at times, and may provide with modification the bases of "invented" names. Owing to the prominence of Ethiopia in the Italian war *Gondar* may have been one such element. But no more than say *Gondwana-land* (that rare venture of geology into poetry)' (Tolkien 1981, 446). The 'Italian war' mentioned was the 1935–1941 occupation of Ethiopia by the fascist government of Benito Mussolini, while the specific phrasing of the final sentence perhaps reflects knowledge of geologist Harry Hess and his 1962 characterisation of continental drift as 'geopoetry' (Hess 1962, 599–601). Several scholars have examined

the extent to which Tolkien may have been aware of the field of plate tectonics as derived from Hess's work (Hynes 2012, 21–22, 27–28; Kaplan 2012).

Gondwanaland was a name proposed in the early twentieth century for a landmass that existed around half a billion years ago, spanning the modern regions of South America, Africa, India, Antarctica, and Australia (Chakrabarti 2019, 119–24). As such, later in the twentieth century – around the time Wegener's theory gained orthodox acceptance – Gondwanaland acquired a political context, especially in the realm of the British Empire on the eve of extensive decolonisation. It was primarily geologists in Australia, New Zealand, South Africa, Chile, and Argentina who advocated the acceptance of continental drift in the late 1950s over those who resisted it in Britain and the United States (Leviton and Aldrich 2012, 247–269). In line with the influence of southern hemisphere scholarship on the theorising of Gondwanaland, that Tolkien ascribed it as 'one such element' along with Ethiopia that may have fed into the naming of Gondor is apt, especially when combined with Tolkien's own South African roots, and the later association of Middle-earth with New Zealand thanks to the Jackson films. It is perhaps no coincidence that in 'On Fairy-Stories' Tolkien uses geology as a metaphor to illustrate the democratic aspect of folklore: 'Fairy-stories are by no means rocky matrices out of which the fossils cannot be prised except by an expert geologist' (Hynes 2012, 21; Tolkien 1983, 129).

In line with the catastrophist elements in the history of Middle-earth, there is another historical era of the legendarium which reflects the breakup of prehistoric supercontinents such as Gondwana. The sinking of Númenor and the dawn of the Second Age was accompanied by the breaking up of the northwest continent Beleriand, the vanishing of the eastern continent Valinor, the shifting of many parts of Middle-earth's coastline, and most dramatically, the reshaping of the world from a flat disc to a sphere (Fonstad 1991, ix-x, 51–53; Hynes 2012, 32n16; Sarjeant 1996, 335–39; Tolkien 1999, 338). This seems a suitable approximation of continental drift and the breaking-up of a supercontinent when seen through the lens of the cosmogony of Tolkien's compendium, and its occurrence at the turning of an Age reflects (in a dramatically accelerated manner) the association of geological change with dating deep time periods.

If Valinor is taken as an equivalent of the Americas, and perhaps Beleriand as Greenland – while reflecting the supercontinent of Laurasia, not Gondwana – then a connection of Eurasia to the Americas prior to the Second Age could explain a mystery noted by Tolkien in his prologue to *The Fellowship of the Ring*: 'There is another astonishing thing about Hobbits of old that must be mentioned, an astonishing habit: they imbibed or inhaled, through pipes of clay or wood, the smoke of the burning leaves of a herb, which they called *pipe-weed* or *leaf*, a variety probably of *Nicotiana*. A great deal of mystery surrounds the origin of this peculiar custom, or 'art' as the Hobbits preferred to call it' (Judd and Judd 2017, 239–242; Tolkien 2004, 8–9;). As Middle-earth is meant to be Eurasia, it is otherwise unclear how tobacco – native to South America – was available thousands of years before the Columbian Exchange. Nor was tobacco the only American crop there; Hobbits also grew potatoes in the Shire, and the Jackson films show the presence of tomatoes and turkeys (Judd and Judd 2017, 248–50; Tolkien 2004, 22).

Origin of Species

The Ethiopian connection to Gondor brings to mind another connection to Middle-earth – for it was in Ethiopia, a year after Tolkien's death, that the remains of the Australopithecus female termed Lucy were discovered, a major find in helping to illustrate the history of hominid evolution. Middle-earth is home to a number of hominids: Men (as Tolkien termed what we might call anatomically modern humans), Elves, Dwarves, and Hobbits primary among them. Tolkien scholar Joe Christopher has argued that

Tolkien likely did not originally intend Hobbits to be related to humans but had changed his mind by the writing of *The Lord of the Rings* (Christopher 2009, 28–36). This change was made clear from the opening of the prologue to *The Fellowship of the Ring*, where Tolkien states that

> It is plain indeed that in spite of later estrangement Hobbits are relatives of ours: far nearer to us than Elves, or even than Dwarves. Of old they spoke the languages of Men, after their own fashion, and liked and disliked much the same things as Men did. But what exactly our relationship is can no longer be discovered. The beginning of Hobbits lies far back in the Elder Days that are now lost and forgotten (Tolkien 2004, 2).

From this, this passage, a genealogy can be interpreted – with little extrapolation needed – whereby Men, Hobbits, Dwarves, and Elves are all related; that Hobbits are closest to Men, and Dwarves in turn closer than Elves; and the 'beginning' (evolution?) of the Hobbits was in a prehistoric past. Outside of *The Lord of the Rings*, Tolkien maintained the connection in his private correspondence. In a 1951 letter to publisher Milton Waldman, Tolkien stated that 'The Hobbits are, of course, really meant to be a branch of the specifically *human* race (not Elves or Dwarves)' (Tolkien 1981, 176n2). In his 1971 letter to Green, Tolkien confirmed that Hobbits were 'a diminutive branch of the human race' (Tolkien 1981, 441).

At least one of the races of Middle-earth seems to be a sort of evolutionary vestige. In the tall, snowy White Mountains that form the northwest border of Gondor live the Drúedain, squat of stature with stumpy limbs, pronounced brow ridges, sunken eyes, flat noses, and wide mouths. The Drúedain are also known as the Púkel-men, after the stone carvings in their likeness made at the start of the Second Age (Day 1979, 206; Fonstad 1991, 86–89; Tolkien 2004, 794–795). A 1967 essay by Margaret Howes, the first effort to integrate geology with Tolkien's history, associates the Drúedain with Mousterian Neanderthal culture (1967, 13). Astronomer Kristine Larsen, who has written extensively on scientific interpretations of Tolkien, suggests that the Drúedain were inspired by the Piltdown man hoax (not conclusively proven as such until 1953) and their association with stone carvings is meant to imply they are a sort of 'living fossil' (Larsen 2015, 183–184; Pyne 2016, 51–83). However, it is possible that their stone carvings were inspired by Palaeolithic 'Venus figurines', while the depiction of the Drúedain themselves as relicts living on the White Mountains seems evocative of the Himalaya-dwelling Yeti, a cryptid whose popularity emerged in Britain in 1925, plenty of time to have shaped the Drúedains' description in Tolkien's posthumously published *Unfinished Tales* (Regal 2011, 31–53; Tolkien 1980, 383–386). Sarjeant further noted the similarity of the Misty Mountains to the Himalayas (Sarjeant 1996, 338).

Concerning Hobbits

Middle-earth, then, is a world in which many related hominid strains coexisted – as our world was until approximately 40,000 years ago, when anatomically modern humans emerged as the sole surviving subspecies. Although Neanderthals are the most famous and prominent subspecies, others include *Homo floresiensis*, which lived in what is now Indonesia and went extinct around 50,000 years ago. Due to their short stature, upon their discovery in 2003 – in the midst of the extremely popular Jackson films' release – they were given the nickname of Hobbits, and provisionally named *Homo hobbitus*. Beginning in 2012 – the year of Jackson's first *Hobbit* film – the Tolkien Estate began to clamp down on the usage of the term 'Hobbit' to describe *Homo floresiensis* (Davis 2012; Larsen 2007, 228). By that time, cryptozoologists were already proposing that some *Homo floresiensis* had survived to the present day in Indonesia and could form the basis for sightings of the Orang-Pendek, the local cryptid equivalent of Bigfoot (Culotta 2007, 740; Heuvelman*s* 1970, 76–

91). Of note as well is that Bigfoot and *The Hobbit* became popular among the counterculture in the 1970s, as both were adopted as mascots by environmental activists (Dickerson and Evans 2006). That the Orang-Pendek could still survive without being catalogued by Western science would likewise be a testament to the surviving of a dense jungle ecosystem in Indonesia, a rare success story in a time of environmental crisis.

But the Oreng-Pendek is not the only mystery hominid that has been associated with the Hobbit. On 16 January 1938, a writer identifying themselves as 'Habit' wrote a letter to the editor of the British newspaper *The Observer*, asking if the diminutive title character of *The Hobbit* was inspired by accounts of 'the "little furry men" seen in Africa by natives and … at least one scientist,' as Habit claimed had been reported by biologist Julian Huxley. On 20 February, *The Observer* published Tolkien's response, including the protestation that

> I was born in Africa, and have read several books on African exploration…. I have no waking recollection of furry pigmies (in book or moonlight); nor of any Hobbit bogey in print by 1904…. And I protest that my hobbit did not live in Africa, and was not furry, except about the feet (Tolkien 1981, 39).

It is not clear what statement of Huxley's inspired Habit's claims, but it was likely a reference to his work on developing national parks in the East African colonies of Kenya, Uganda, and Tanganyika for the British Colonial Office in the early 1930s where he encountered bonobos – then called pygmy chimpanzees – and which Habit likely in turn confused for human pygmies (Christopher 2009, 34).

Given the early questioning for the link between Hobbits and 'furry African pygmies,' one further development is worth noting. In December 1937, two months after the publication of *The Hobbit*, British colonial administrator William Hichens published an account of his purported encounter in Tanganyika 'some years ago' with diminutive hairy hominids. Hichens claimed that the natives called them Agogwe, that they lived in the region's forests, and that they might do one's farming at night in exchange for payment in food and beer (Heuvelmans 1970, 277–283; Hichens 1937, 373). This certainly sounds like Hobbit behaviour, and other cryptozoologists have in turn compared the Agogwe to the Orang-Pendek (Mayes 2009). Perhaps Habit had been more correct than they knew, and Hobbits do indeed remain alive not only in Indonesia, but East Africa.

Creatures of Another Age

As mentioned above, palaeontology was one of the fields that Tolkien considered – even if retroactively – in connection to analysis of the history of Middle-earth. However, amateur palaeontology itself played a minor role in the development of young Tolkien's imagination. Historian Adrienne Mayor has proposed (although not without challenge – see Witton and Hing's article in this issue) – that fossil discoveries by pre-modern peoples, particularly fossilised *Protoceratops* eggs in Central Asia, contributed to the development of legends of such creatures as dragons and gryphons (Mayor 2005, 2–33). So it was with Tolkien. In his 1938 Oxford lecture on dragons, Tolkien recounted how in 1906 he was taken on a holiday to Lyme Regis, famous as the site where Mary Anning collected her fossils. There, the 14-year-old Tolkien found a fossilised jawbone, which he imagined to be a piece of a petrified dragon (Tolkien 1938, 44). In reality, it was likely from an ichthyosaur (Batt and Dove*r* 2013; Larsen 2015, 170–71). Indeed, in his Oxford lecture, Tolkien found a way to connect his childhood discovery with palaeontology by suggesting that dinosaur remains inspired dragons. He specifically mentions the Central Asian fossil eggs, only discovered in 1923, thereby anticipating Mayor's more-popularised theory by over half a century (Tolkien 1938, 41–45).

Elements of palaeontology, and the prehistoric creatures unearthed by that science, can be found throughout *The Lord of the Rings* in particular. In *The Fellowship of the Ring*, the Dwarves of Moria dig deep into the mountain, uncovering a Balrog, a fiery demon servant of Morgoth, Middle-earth's Satan equivalent. In his 1954 letter to Mitchison, Tolkien asserted that the Balrog was a remnant of the First Age (Tolkien 1981, 197, 216–217; Tolkien 2004, 317). From this comes a schema where Tolkien's writing acknowledges that different types of lifeforms existed at different Ages; that they could go extinct but be discovered underground; and that the deeper an extinct creature was discovered, the further back its age of origin.

In terms of Middle-earth species with a more recent extinction date, perhaps most prominent are the mûmakil – termed oliphaunts by the Hobbits – ridden by the Haradrim army (Day 1979, 180–181). In his 1944 letter to his son Christopher, Tolkien described the mûmakil as 'A large elephant of prehistoric size … commonly supposed to be mythical' (Tolkien 1981, 87). This would seemingly make the mûmakil something of a cryptid to the Middle-earth residents of the Third Age, along the lines of alleged modern-day sightings of living woolly mammoths in Alaska or Siberia (Heuvelmans 1970, 221–238). Appropriately enough, the first effort to apply geology to Middle-earth in 1967 projected Tolkien's history from the Fourth Age through the late Pleistocene, when mammoths historically went extinct outside of island relicts (Howes 1967, 7–13; Sarjeant 1996, 334). While the Jackson films based the mûmakil on the straight-tusked elephant which went extinct thirty thousand years ago, Tolkien was likely inspired by woolly mammoths whose extinction was only four thousand years ago, comfortably anteceding the Third Age (Larsen 2015, 177–178). However, when a mûmak first appears in *The Two Towers*, it is described as 'a beast of vast bulk, and the like of him does not walk now in Middle-earth; his kin that live still in latter days are but memories of his girth and majesty,' which seems to indicate that modern elephants are the shrunken descendants of the mûmakil (Tolkien 2004, 661). Of note is that populations of pygmy mammoths did exist on islands in California and Russia, and dwarf elephants (descended from the straight-tusked elephant) lived on several Mediterranean islands – as well as the Indonesian habitat of *Homo floresiensis*, who themselves may have been a shaped by the same process of insular dwarfism (Schrein 2016).

Another connection to extinct animals comes from *The Return of the King*. In the climactic battle, the Witch-King of Angmar flies on a fellbeast, a 'winged creature … neither quill nor feather did it bear, and its vast pinions were as webs of hide between horned fingers…. A creature of an older world maybe it was, whose kind, lingering in forgotten mountains cold beneath the Moon, outstayed their day' (Tolkien 2004, 840). In his 1958 letter to Beare, Tolkien explained that

> I did not intend the steed of the Witch-King to be what is now called a 'pterodactyl', and often is drawn (with rather less shadowy evidence than lies behind many monsters of the new and fascinating semi-scientific mythology of the 'Prehistoric'). But obviously it is *pterodactylic* and owes much to the new mythology, and its description even provides a sort of way in which it could be a last survivor of older geological eras (Tolkien 1981, 298).

Tolkien's interest in the pterodactyl possibly stems from its association with English fossil beds, and his early playing with British history and traditions as a framework for Middle-earth (Larsen 2015, 173–179; Rateliffe 2006, 77; Shelton 2022). As early as his Oxford lecture, he referred to the *Pteranodon* as an example of a 'Scientific "dragon"' (Tolkien 1938, 41–42).

In drawing inspiration from pterodactyls for his flying monster, Tolkien was in well-trod territory, again recycling a concept from the Victorian era (McGowan-Hartmann 2013, 47–70). The 1863 novel *The Water-Babies* by Charles Kingsley was the first work of fiction to associate dragons with pterodactyls, but the fictional use of this claim was predated by decades of Victorian speculation over the

pterodactyl in mythology (Kingsley 1863, 56–57; O'Connor 2013, 29–30). As early as 1829, geologist William Buckland's commentary on a 'New Species of Pterodactyl' included a description of Satan from John Milton's 1667 epic poem *Paradise Lost* (Fallon 2021, 13). Tolkien himself was confident that St George could have defeated a *Ceratosaurus* in combat (Tolkien 1938, 48).

Tolkien's 'new mythology', by which the science of palaeontology was merged with Germanic legends, was clearly not so new by the 1950s. But it found a revitalisation in inverse given the fact that many fossil species have been named in honour of Tolkien and his creations, far beyond just the Indonesian Hobbits (Larsen 2007, 226–229). These are example of what historian of science Jonathan Topham calls the 'feedback mechanism' from popular culture into science Jonathan Topham (2009, 16) and sceptic Daniel Loxton termed the use of 'culturally-available templates' Daniel Loxton (2015). These feedback mechanisms have helped fuel contemporary heterodox views of both science and politics – and in turn, help ensure that not only mainstream palaeontologists draw inspiration from Middle-earth for their interpretations of the past.

From Middle-Earth to Fringe Belief

In 2022, far-right politician Giorgia Meloni became prime minister of Italy, making history not just for being the first woman to hold the position, but for her admiration of fascist dictator Benito Mussolini, leader of the 1935 invasion of Ethiopia which contributed to the naming of Gondor. Meloni's government brought with it not only an attempt to whitewash relations with Ethiopia, but also sponsored an exhibit in Rome titled 'Tolkien: Man, Professor, Author' – spurred on by the love of Tolkien not only by Meloni herself, but many across her far-right base (Phipps 2024; Winfield 2023). Nor was this phenomenon limited to the Italian far-right. *The Lord of the Rings* has for decades helped fuel a popular imagination of what mediaeval Europe was like. Another major cultural production contributing to the popular imaginary of the European Middle Ages is the 'renaissance fair', an event originating in 1963 Los Angeles – the home of Hollywood, and the decade *The Lord of the Rings* exploded in popularity. Renaissance fairs tend to blend a wide range of historical detail with explicit fantasy elements, and the iconic food sold there is the turkey leg – which would not have been eaten in European during the Renaissance, or known about at all during the Middle Ages – a synthesis which neatly parallels the Hobbit habits of Middle-earth (McCarthy 2014, 108–110).

The far-right, in not only Italy but the United States, have in recent years become firmly attached to this fiction- and fantasy-derived conception of the Middle Ages. This far-right sees this notion of the Mediaeval period – the 'traditional' notion of a purely White, non-secular, and hierarchical West – as a template for the modern world to 'Retvrn' [*sic*] to, as online adherents term it (Blake 2020, 179–197; Vargas 2020). The draw is enough that also in 2022, Neo-Nazi Riley Williams – under house arrest due to her participation in the 6 January 2021 attack on the US Capitol – was given leave by a sympathetic judge to attend the Pennsylvania Renaissance Fair (Romo 2022).

These groups have also become the primary advocates of the pseudohistorical theories of Graham Hancock (advocating a global mercantile civilisation over ten thousand years ago) and the Solutrean Hypothesis (which claims that a land bridge over the North Atlantic during the Ice Age allowed for European settlement of the Americas before arrival of the Palaeoindians). An example of how these concepts could have been influenced from Tolkien's work is evident from Margaret Howes' essay. Howes speculates that the Fourth Age ended when the descendants of the victorious Men discovered subterranean caverns filled with the leftover war machines of Sauron, leading to an industrial civilisation whose eventual apocalyptic collapse not only destroyed the Kingdom of Men, but caused massive flooding, leading to modern Eurafrican geography (5–7). This evocatively predicts Hancock's decades-later

claims about the ancient (White) civilisation he associates with Atlantis and which has gained him a strong following among the online far-right (Shermer 2023).

It is highly unlikely that Hancock drew inspiration from Howes' article, or even Tolkien directly. But this shows how politically heterodox notions unintentionally but unfortunately can be equated with the legendarium's heterodox palaeohistory, and subsequently make Tolkien's work appealing to the far-right. Not only does Hancock's Atlantis and Tolkien's Middle-earth been seen as providing ostensibly hierarchical, White-led (or -only) societies superior to surrounding (literally or metaphorically) non-White barbarians as a model for the modern West, but Tolkien has also retroactively been turned into a sort of similar heterodox intellectual guru for the online alt-right of a sort that Hancock has consciously modelled himself into (Reid 2023; Straus, Meltzer and Goebel 2005, 507–532). Another example of this appropriation of *The Lord of the Rings* by the far right can be seen in the online reaction – termed 'trolling', in suitably Tolkienian terms – to the diverse casting of *The Rings of Power*, in contrast to the almost entirely white cast of the Jackson films (Stewart 2022). Even further to the fringe, right-wing conspiracist David Avocado Wolfe has extensively cited *The Lord of the Rings* in the construction of his worldview – literally. A Young-Earth Creationist (YEC), Wolfe believes that Middle-earth is an accurate depiction of what the world was like – including its flat shape – prior to the sinking of Atlantis, bringing it full circle to Tolkien's basis for Númenor (Butt and Ondes 2023).

Nor is Wolfe the only right-wing pseudohistorian to draw influence from Tolkien's legacy – or even the most influential. In 2007, the YEC group Answers in Genesis (AiG; see also the Laurence article in this issue) created the Creation Museum in Kentucky, followed in 2016 by the Ark Encounter, a supposedly life-sized Noah's Ark replica. These two organisations promote AiG's beliefs that the Earth was created by God 6,000 years ago, and as such that dinosaurs not only coexisted with humans in the era of Genesis, but survived on the Ark, inspired dragon legends across the world, and continue to survive in Africa today. The AiG designs for both dinosaurs and 'dragon slayers' such as St George were influenced by designs from Jackson's *Lord of the Rings,* with AiG designers being drawn by the films' attention to 'historical' detail in its costuming (Bielo 2016, 95).

AiG has also endorsed the identification of *Homo floresiensis* as 'Hobbits' to trade on the popularity of *The Lord of the Rings* to promote its anti-evolution stance (Lubenow 2006). Wolfe draws from the YEC playbook, stating his belief that *The Lord of the Rings* depicts a historical period when humans rode domesticated dinosaurs. In constructing this view, Wolfe has used the Paluxy River footprints – fossilised tracks in Texas, which in 1939 YECs claimed depicted humans and dinosaurs walking together – as evidence to support his belief in the accuracy of *The Lord of the Rings* as a historical document, seemingly unwittingly building off of Tolkien's own use of 'pterodactylic' elements (Butt and Ondes 2023; Feder 2010, 166–168).

Despite the YEC penchant for both cryptozoology and *The Lord of the Rings*, Tolkien's legendarium obviously has a much wider influence, and that influence exposed millions of readers – and viewers of adaptations – to a wide range of heterodox palaeoscience views. Although Hobbit evolution, the geological reshaping of Valinor, and Númenor as a model for the Minoan theory of Atlantis are overall minor parts of the legendarium – particularly its most popular elements, *The Hobbit* and *The Lord of the Rings* – the fact that Tolkien considered such a wide range of palaeoscience views from across the spectrum of orthodoxy in the development of such a popular work demonstrates the effectiveness of fiction as a medium for disseminating controversial or minority scientific views. Arguably, not until *Jurassic Park*, with its prominent advocacy of avian dinosaurs and featuring of de-extinction, did a piece of fiction shaped by heterodox palaeoscience have such a wide reach (see also the Chambers and McCahey article in this issue). One can only be glad that InGen went bankrupt before it could attempt to resurrect any of the beasts that roamed across Mordor of the Third Age.

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References

Batt, Margaret, and John Dover. 2013. "JRR Tolkien and the influence of Lyme Regis." Lyme Regis Museum, April 2013, accessed 22 May 2023. https://www.lymeregismuseum.co.uk/lrm/wp-content/uploads/2021/08/jrr_tolkien_article.pdf.

Bielo, James S. 2016. "Creationist History-Making: Producing a Heterodox Past." In *Lost City, Found Pyramid: Understanding Alternative Archaeologies and Pseudoscientific Practices*, edited by Jeb J. Card, and David S. Anderson, 81–101. Tuscaloosa: University of Alabama Press.

Blake, Thomas. 2020. "Getting Medieval Post-Charlottesville: Medievalism and the Alt-Right." In *Far-Right Revisionism and the End of History: Alt/Histories*, edited by Louie Dean Valencia-García, 179–97. New York: Routledge.

Butt, Julian Paul, and Sean Ondes. 2023. "Premium Episode 4: David Avocado Wolfe (Unlocked)." *Wetwired*, 25 March 2023, accessed 6 April 2023. https://player.fm/series/wetwired/premium-episode-4-david-avocado-wolfe-unlocked-e6jacf4ElmcreBgJ.

Carpenter, Humphrey. 1977. *Tolkien: A Biography*. Boston: Houghton Mifflin.

Chakrabarti, Pratik. 2019. "Gondwana and the Politics of Deep Past." *Past & Present* 242 (1): 119–53. DOI: 10.1093/pastj/gty016.

Christopher, Joe R. 2009. "Snergs, Hobbits, Hobs, Bonobos, Pygmies." *The Lamp-Post of the Southern California C. S. Lewis Society* 31 (2): 28–36.

Culotta, Elizabeth. 2007. "The Fellowship of the Hobbit." *Science* 317 (5839): 740–42. DOI: 10.1126/science.317.5839.740.

Davis, Lauren. 2012. "Archaeologists banned from referring to ancient humanoids as "hobbits"." *Gizmodo*, 4 November 2012, accessed 19 May 2023. https://gizmodo.com/archaeologists-banned-from-referring-to-ancient-humanoi-5956914.

Day, David. 1979. *A Tolkien Bestiary*. New York: Ballantine Books.

Dickerson, Matthew T., and Jonathan Evans. 2006. *Ents, Elves, and Eriador: The Environmental Vision of J.R.R. Tolkien*. Lexington: University Press of Kentucky.

Dunne, J. W. 1927. *An Experiment with Time*. New York: The Macmillan Company.

Fallon, Richard. 2021. *Reimagining Dinosaurs in Late Victorian and Edwardian Literature: How the 'Terrible Lizard' Became a Transatlantic Cultural Icon*. Cambridge: Cambridge University Press.

Feder, Kenneth L. 2010. *Encyclopedia of Dubious Archaeology: From Atlantis to the Walam Olum*. Santa Barbara: ABC-CLIO.

Flieger, Verlyn. 1997. *A Question of Time: J. R. R. Tolkien's Road to Faërie*. Kent: The Kent State University Press.

Fonstad, Karen Wynn. 1991. *The Atlas of Middle Earth, Revised Edition*. Boston: Houghton Mifflin.

Galanopoulos, A. G. 1960. "Tsunamis Observed on the Coasts of Greece from Antiquity to Present Time." *Annali di Geofisi* 13 (3–4): 369–86. DOI: 10.4401/ag-5477.

Goodrum, Matthew R. 2016. "The Beginnings of Human Palaeontology: Prehistory, Craniometry and the 'Fossil Human Races'." *The British Journal for the History of Science* 49 (3): 387–409. DOI: 10.1017/S0007087416000674.

Hazell, Dinah. 2006. *The Plants of Middle Earth: Botany and Sub-Creation*. Kent: The Kent State University Press.

Hess, Harry. 1962. "History of Ocean Basins." In *Petrologic Studies: A Volume in Honor of A. F. Buddington*, edited by A. E. J. Engel, Harold L. James, and B. F. Leonard, 599–620. Boulder: Geological Society of America.

Heuvelmans, Bernard, trans. Rupert Hart-Davis. 1970 [1955]. *On the Track of Unknown Animals*. London: Granada Publishing.

Hichens, William. 1937. "African Mystery Beasts." *Discovery: A Monthly Popular Journal of Knowledge* 18: 369–73.

Howes, Margaret M. 1967. "The Elder Ages and the Later Glaciations of the Pleistocene Epoch." *Tolkien Journal* 3 (2): 3–15. 21.

Hynes, Gerard. 2012. ""Beneath the Earth's Dark Keel": Tolkien and Geology." *Tolkien Studies* 9: 21–36. DOI: 10.1353/tks.2012.0005.

Judd, Walter S., and Graham A. Judd. 2017. *Flora of Middle-Earth: Plants of J. R. R. Tolkien's Legendarium*. Oxford: Oxford University Press.

Kaplan, Sanford S. 2012. "The Geology of Middle-earth." *Tolkien Encyclopedia*, 20 April 2012, accessed 6 March 2024. https://valarguild.org/tolkien/encyc/papers/Sandalf13/3GeologyofMiddle-earth.htm#IV.

Kingsley, Charles. 1922 [1863]. *The Water-Babies: A Fairy Tale for a Land Baby*. London: Macmillan & Co.

Larsen, Kristine. 2007. "Sauron, Mount Doom, and Elvish Moths: The Influence of Tolkien on Modern Science." *Tolkien Studies* 4: 223–34. DOI: 10.1353/tks.2007.0024.

Larsen, Kristine. 2015. "'A Creature of an Older World': Tolkien and the Mythology of the Prehistoric." *Lembas Extra: Journal of the Dutch Tolkien Society* 20: 167–90.

Larsen, Kristine. 2020. "Númenor and the "Devouring Wave": Literary, Historical, and Psychological Sources for Tolkien's Self-Described "Atlantis Complex"." *Journal of Tolkien Research* 11 (2): 1–13.

Leviton, Alan, and Michele Aldrich. 2012. "Contributions of the Geological Survey of India, 1851-1890, to the Concept of Gondwána-Land." *Earth Sciences History* 31: 247–69.

Loxton, Daniel. 2015. "The Problematic Process of Cryptozoologification.' Skeptic, 31 August 2015, accessed 16 February 2024. https://www.skeptic.com/insight/cryptozoologification/.

Lubenow, Marvin. 2006. "'Hobbits" Were Real!.' Answers in Genesis, 13 September 2006, accessed 22 May 2023. https://answersingenesis.org/human-evolution/homo-floresiensis/hobbits-were-real/.

MacRitchie, David. 1909. "A New Solution of the Fairy Problem." *The Celtic Review* 6 (22): 160–76. DOI: 10.2307/30070215.

Mayes, Michael. 2009. "The Hobbit and the Sasquatch." Texas Cryptid Hunter, 22 January 2009, accessed 22 May 2023. http://texascryptidhunter.blogspot.com/2009/01/hobbit-and-sasquatch.html.

Mayor, Adrienne. 2005. *Fossil Legends of the First Americans*. Princeton: Princeton University Press.

McCarthy, Patrick. 2014. ""Living History" as the "Real Thing": A Comparative Analysis of the Modern Mountain Man Rendezvous, Renaissance Fairs, and Civil War Reenactments." *ETC: A Review of General Semantics* 71 (2): 106–23.

McGowan-Hartmann, John. 2013. "Shadow of the Dragon: The Convergence of Myth and Science in Nineteenth Century Paleontological Imagery." *Journal of Social History* 47 (1): 47–70. DOI: 10.1093/jsh/sht048.

O'Connor, Ralph. 2013. "The Place of Myth in Modern Science: Some Theoretical Considerations." In *Science, Fables and Chimeras: Cultural Encounters*, edited by Roussillon-Constanty Laurence, and Murillo Philippe, 19–36. Newcastle upon Tyne: Cambridge Scholars Publishing.

Phipps, John. 2024. "How Italy's Post-Fascists Fell in Love With J. R. R. Tolkien." Jacobin, 25 February 2024, accessed 20 March 2024. https://jacobin.com/2024/02/giorgia-meloni-tolkien-fascism-fantasy.

Þórarinsson, Sigurður, trans. Jóhann Hannesson. 1970. *Hekla: A Notorious Volcano*. Reykjavík: Almenna bókafélagið.

Pyne, Lydia. 2016. *Seven Skeletons: The Evolution of the World's Most Famous Human Fossils*. New York: Viking.

Rateliff, John D. 2006. "'And All the Days of Her Life Are Forgotten': The Lord of the Rings as Mythic Prehistory." In *The Lord of the Rings 1954–2004: Scholarship in Honor of Richard E. Blackwelder*, edited by Wayne G. Hammond, and Christina Scull, 67–100. Milwaukee: Marquette University Press.

Regal, Brian. 2011. *Searching for Sasquatch: Crackpots, Eggheads, and Cryptozoology*. New York: Palgrave Macmillan.

Reid, Robin A. 2023. "J.R.R. Tolkien, Culture Warrior: The Alt-Right's Crusade Against the Tolkien Society's 2021 Summer Seminar on "Tolkien and Diversity"." *Journal of Tolkien Research* 16 (2): 1–16.

Romo, Vanessa. 2022. "The woman accused of stealing Pelosi's laptop gets to attend Renaissance Faire." *NPR*, 20 August 2022, accessed 23 August 2022. https://www.npr.org/2022/08/20/1118595848/the-woman-accused-of-stealing-pelosis-laptop-gets-a-house-arrest-break-for-ren-f.

Ryan, J. S. 2013. *In the Nameless Wood: Explorations in the Philological Hinterland of Tolkien's Literary Creations*. Zollikofen: Walking Tree Publishers.

Sarjeant, William Antony Swithin. 1996. "The Geology of Middle-Earth." *Mythlore: A Journal of J. R. R. Tolkien, C. S. Lewis, Charles Williams, and Mythopoeic Literature* 21 (2): 334–39.

Schrein, Caitlin. 2016. "Why Dwarfism?." SAPIENS, 17 June 2016, accessed 25 May 2023. https://www.sapiens.org/biology/island-dwarfism/.

Shelton, Luke. 2022. "Why Calling Tolkien's Work "A Mythology for England" is Wrong and Misleading." Luke Shelton PhD, 12 February 2022, accessed 19 March 2024. https://luke-shelton.com/2022/02/12/why-calling-tolkiens-work-a-mythology-for-england-is-wrong-and-misleading/.

Shermer, Michael. 2023. "Alternative Civilization and Its Discontents: An Analysis of the Alternative Archaeologist Graham Hancock's Claim That an Ancient Apocalypse Erased the Lost Civilization of Atlantis." Skeptic, 16 June 2023, accessed 15 March 2024. https://www.skeptic.com/reading_room/analysis-of-graham-hancocks-claim-that-ancient-apocalypse-erased-lost-civilization-of-atlantis/.

Spence, Lewis. 1925. *Atlantis in America*. London: Ernest Benn.

Stewart, Andrew. 2022. "On Lord of the Rings: The Rings of Power, Alt-Right Trolls, and Racism in JRR Tolkein's Writings." CounterPunch, 16 September 2022, accessed 23 May 2023. https://www.counterpunch.org/2022/09/16/on-lord-of-the-rings-the-rings-of-power-alt-right-trolls-and-racism-in-jrr-tolkeins-writings/.

Straus, Lawrence Guy, David J. Meltzer, and Ted Goebel. 2005. "Ice Age Atlantis? Exploring the Solutrean-Clovis 'Connection'." *World Archaeology* 37 (4): 507–32.

Tolkien, J. R. R. 1980 edited by Christopher, and Tolkien. *Unfinished Tales of Númenor and Middle-Earth*. Boston: Houghton Mifflin.

Tolkien, J. R. R. 1981. *The Letters of J. R. R. Tolkien*, edited by Humphrey Carpenter, and Christopher Tolkien. London: George Allen & Unwin.

Tolkien, J. R. R. 1983. *The Monsters and the Critics, and Other Essays*. Boston: Houghton Mifflin.

Tolkien, J. R. R. 1999 [1977]. . *The Silmarillion,* . 2nd edn. New York: Ballantine Books.

Tolkien, J. R. R. 2004 [1954–1955]. *The Lord of the Rings*. Boston: Houghton Mifflin.

Tolkien, J. R. R. 1938. "Dragons." In *The Hobbit 1937–2017*, edited by Christina Scull, and Wayne G. Hammond, 39–62. London: HarperCollins.

Topham, Jonathan R. 2009. "Rethinking the History of Science Popularization/Popular Science." In *Popularizing Science and Technology in the European Periphery, 1800–2000*, edited by Faidra Papanelopoulou, Agustí Nieto-Galan, and Enrique Perdiguero, 1–20. London: Routledge.

Vargas, Michael A. 2020. "Medieval Fair Fantasies and the Alt-Right." Making it Medieval, 16 January 2020, accessed 14 April 2022. https://pastinthepresent.blog/2020/01/16/medieval-fair-fantasies-and-the-alt-right/.

Vitaliano, Dorothy B. 1968. "Geomythology: The Impact of Geologic Events on History and Legend with Special Reference to Atlantis." *Journal of the Folklore Institute* 5 (1): 5–30.

Winfield, Nicole. 2023. "Italy begins to reckon with Fascist-era colonial collections." The Independent, 10 May 2023, accessed 20 March 2024. https://www.independent.co.uk/news/ap-mussolini-rome-giorgia-meloni-vatican-b2336042.html.